

Integrated Motion Planning and Autonomous Control Technology for Autonomous ISR, Phase I

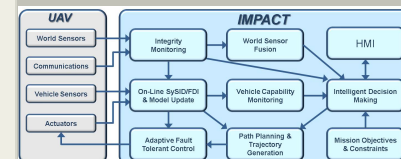
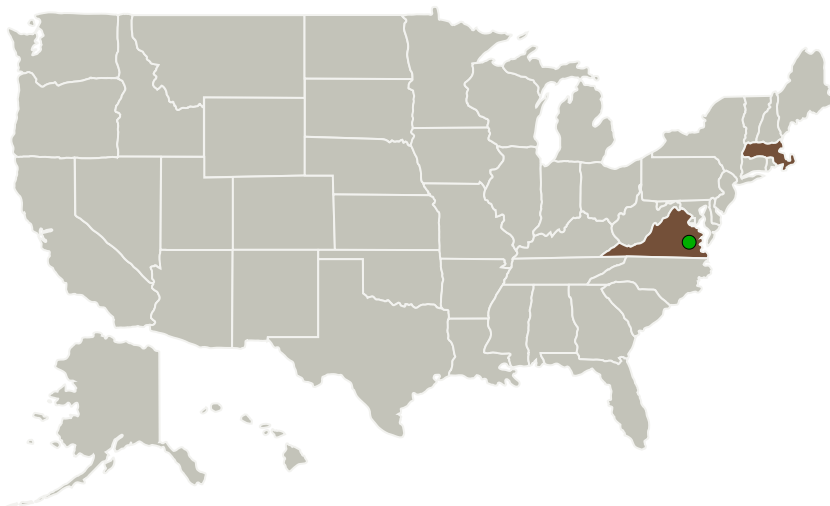
Completed Technology Project (2013 - 2014)



Project Introduction

SSCI and MIT propose to design, implement and test a comprehensive Integrated Mission Planning & Autonomous Control Technology (IMPACT) for Autonomous ISR missions employing collaborating Unmanned Aerial Vehicles (UAV). The main feature of the IMPACT system for Autonomous ISR is that it is based on robust real-time learning about dynamic and stochastic environments, and on a capability to autonomously react to contingencies while satisfying the mission objectives and the overall flight safety. The project will leverage a number of technologies recently developed by SSCI and MIT, and integrate various system modules within a flexible and user-friendly framework. In order to achieve the project objectives, the following tasks will be carried out: (i) Problem Statement & Test Scenario Selection jointly with NASA; (ii) Develop, Implement & Test Vehicle-level Subsystems; (iii) Develop, Implement & Test Mission-level Subsystems; and (iii) Carry out Integration & Initial Testing of the overall IMPACT System for an Autonomous ISR mission. Phase II of the project will be focused on the enhancements and full implementation of the IMPACT system, prototype system development, and demonstration of its features through hardware-in-the-loop simulations and flight tests at MIT.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Scientific Systems Company, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Woburn, Massachusetts
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia
Massachusetts Institute of Technology(MIT)	Supporting Organization	Academia	Cambridge, Massachusetts

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Scientific Systems Company, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jovan Boskovic

Project Transitions

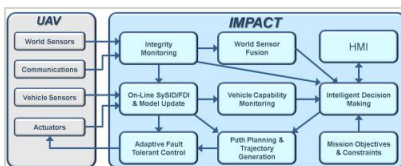
▶ **May 2013:** Project Start

✓ **May 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140719>)

Images



Project Image

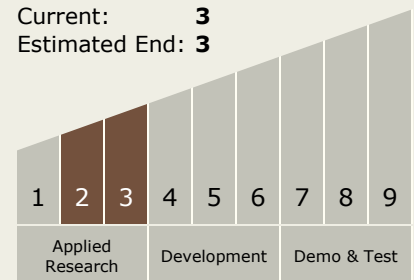
Integrated Motion Planning and Autonomous Control Technology for Autonomous ISR
(<https://techport.nasa.gov/image/131266>)

Technology Maturity (TRL)

Start: **2**

Current: **3**

Estimated End: **3**



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Technology Areas

Primary:

- TX10 Autonomous Systems
 - └ TX10.2 Reasoning and Acting
 - └ TX10.2.3 Motion Planning

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System